

CLAIMS

What is claimed is:

- 1 1. A fluid flow divider for dividing fluid flow within a body lumen into at least two
2 channels, the fluid flow divider comprising a first end and a second end, a top surface and a
3 bottom surface, and the flow divider having a deployed state wherein the flow divider divides
4 fluid flow through the body lumen into a first flow channel and a second flow channel.
- 1 2. The fluid flow divider of claim 1, wherein the first flow channel is defined by a
2 portion of the circumference of the walls of an aortic lumen and the top surface of the flow
3 divider, and the second flow channel is defined by a portion of the circumference of the walls
4 of the aortic lumen and the bottom surface of the flow divider.
- 1 3. The fluid flow divider of claim 2, wherein an upstream end of the first flow channel is
2 substantially closed to fluid flow originating from upstream of the fluid flow divider.
- 1 4. The fluid flow divider of claim 1, further comprising a means for perfusing at least
2 one of the channels with a fluid.
- 1 5. The fluid flow divider of claim 1, wherein fluid flow in each flow channel is
2 substantially isolated from the fluid flow of the other flow channel by the fluid flow divider.
- 1 6. The fluid flow divider of claim 1, wherein the fluid flow divider comprises at least one
2 inflatable chamber.
- 1 7. The fluid flow divider of claim 6, wherein the at least one inflatable chamber is
2 configured to have a plurality of lateral support members when inflated.
- 1 8. The fluid flow divider of claim 7, wherein the at least one inflatable chamber is
2 configured to have a peripheral support tube and a plurality of lateral support members when
3 inflated.

- 1 9. The fluid flow divider of claim 1, wherein the fluid flow divider comprises an
2 inflatable peripheral support tube.
- 1 10. The fluid flow divider of claim 1, further comprising a catheter having a catheter shaft
2 with a distal end.
- 1 11. The fluid flow divider of claim 10, wherein the catheter shaft extends along the top
2 side of the flow divider.
- 1 12. The fluid flow divider of claim 10, wherein the first end of the flow divider extends
2 beyond the distal end of the catheter shaft.
- 1 13. The fluid flow divider of claim 10, wherein the catheter shaft extends from the top
2 side of the flow divider, through the flow divider at a point proximate the first end of the flow
3 divider to the bottom side of the flow divider.
- 1 14. The fluid flow divider of claim 10, wherein the distal end of the catheter shaft extends
2 beyond the first end of the flow divider.
- 1 15. The fluid flow divider of claim 1, further comprising an embolic filter for filtering
2 fluid flow through the body lumen.
- 1 16. The fluid flow divider of claim 10, wherein the catheter shaft extends from the bottom
2 side of the flow divider through a point proximate the second end of the flow divider, extends
3 along a portion of the top side of the flow divider, then extends through the flow divider at a
4 point proximate the first end of the flow divider to the bottom side of the flow divider.
- 1 17. The fluid flow divider of claim 1, further comprising a catheter shaft having a first
2 perfusion lumen for perfusing the first fluid flow channel with a fluid.
- 1 18. The fluid flow divider of claim 1, further comprising a catheter shaft having a first
2 perfusion lumen for perfusing the first fluid flow channel with a fluid and a second perfusion
3 lumen for perfusing the second fluid flow channel with a fluid.

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- 1 19. The fluid flow divider of claim 18, wherein the flow divider is formed in a concave
2 configuration.
- 1 20. The fluid flow divider of claim 10, further comprising a flow control member coupled
2 to the catheter shaft between the distal end of the catheter shaft and the first end of the flow
3 divider.
- 1 21. The fluid flow divider of claim 18, wherein the flow control member comprises at
2 least one inflatable balloon.
- 1 22. The fluid flow divider of claim 18, wherein the flow control member comprises at
2 least one deployable valve.
- 1 23. The fluid flow divider of claim 1, wherein the flow divider comprises a plurality of
2 arms, and a webbing material extending between the catheter shaft and the plurality of arms
3 and between adjacent pairs of the plurality of mechanically deployable arms.
- 1 24. The fluid flow divider of claim 23, wherein the plurality of arms are mechanically
2 deployable.
- 1 25. The fluid flow divider of claim 23, wherein the plurality of arms are flexible.
- 1 26. The fluid flow divider of claim 23, wherein the plurality of arms are inflatable.
- 1 27. The fluid flow divider of claim 23, wherein the flow divider is deployable from within
2 a catheter shaft.
- 1 28. The fluid flow divider of claim 1, wherein the fluid flow divider is configured to
2 generate low turbulence fluid flow between a first fluid flow stream in the first fluid flow
3 channel and a second fluid flow stream the second fluid flow channel.
- 1 29. The fluid flow divider of claim 1, wherein the fluid flow divider is configured to
2 generate laminar fluid flow between a first fluid flow stream in the first fluid flow channel
3 and a second fluid flow stream the second fluid flow channel.

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1 30. The fluid flow divider of claim 1, wherein the fluid flow divider further comprises a
2 permeable portion.

1 31. The fluid flow divider of claim 30, wherein the fluid flow divider further comprises a
2 peripheral tube.

1 32. The fluid flow divider of claim 30, wherein the fluid flow divider further comprises a
2 chamber formed between an upper film of the flow divider and a lower film of the flow
3 divider.

1 33. The fluid flow divider of claim 32, wherein an interior of the peripheral tube is in fluid
2 communication with the chamber of the fluid flow divider.

1 34. The fluid flow divider of claim 32, wherein at least one portion of the upper film is
2 coupled to at least one portion of the lower film.

1 35. The fluid flow divider of claim 1, wherein the flow divider is deployed by extending at
2 least one deployment wire into the flow divider.

1 36. The fluid flow divider of claim 35, wherein the flow divider further comprises a
2 peripheral tube to receive the at least one deployment wire.

1 37. The fluid flow divider of claim 35, wherein the fluid flow divider further comprises a
2 catheter having a catheter shaft, and wherein a distal end of the at least one deployment wire
3 is coupled to an exterior surface of the catheter shaft.

1 38. The fluid flow divider of claim 10, wherein the fluid flow divider is deployed from a
2 distal opening of a lumen within the catheter shaft.

1 39. The fluid flow divider of claim 38, wherein the fluid flow divider further comprises a
2 flexible spine.

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- 1 40. The fluid flow divider of claim 39, wherein the fluid flow divider further comprises
2 lateral stiffeners.
- 1 41. The fluid flow divider of claim 1, wherein the fluid flow divider further comprises
2 lateral stiffeners.
- 1 42. The fluid flow divider of claim 38 wherein the fluid flow divider is deployed using a
2 deployment wire.
- 1 43. The fluid flow divider of claim 42, wherein the fluid flow divider further comprises a
2 retraction wire.
- 1 44. A method for preventing cerebral embolization comprising deploying a fluid flow
2 divider within an aortic lumen for dividing aortic blood flow into at least two channels,
3 including a first channel and a second channel.
- 1 45. The method for preventing cerebral embolization of claim 44, wherein the fluid flow
2 divider is deployed within an aortic arch.
- 1 46. The method for preventing cerebral embolization of claim 45, wherein the first
2 channel is in fluid communication with at least one aortic arch branch vessel.
- 1 47. The method for preventing cerebral embolization of claim 46, further comprising
2 perfusing the first channel with a fluid.
- 1 48. The method for preventing cerebral embolization of claim 47, further comprising
2 perfusing the second channel with a fluid.
- 1 49. The method for preventing cerebral embolization of claim 44, further comprising
2 occluding the lumen of the ascending aorta upstream of the fluid flow divider.
- 1 50. The method for preventing cerebral embolization of claim 49, further comprising
2 infusing a cardioplegic agent into the root of the ascending aorta.